

filter group representing a column comprises an array of said color filters;

the first color filter group comprising an alternate array of first and second color filters;

the second color filter group comprising an alternate array of third and fourth color filters;

the third color filter group comprising an alternate array of the second and first color filters;

the fourth color filter group comprising an alternate array of the fourth and third color filters;

the fifth color filter group being composed in the same manner as the third color filter group;

the sixth color filter group being composed in the same manner as the second color filter group;

the seventh color filter group being composed in the same manner as the first color filter group; and

the eighth color filter group being composed in the same manner as the fourth color filter group.

2. An image pickup device according to claim 1, wherein said first to fourth color filters are of yellow, cyan, magenta and green.

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8. (Amended) An image pickup device comprising:  
a color filter array comprising the color  
filters arranged in the horizontal and vertical directions;  
plural pixels including photoelectric  
converting elements arranged in the horizontal and vertical  
directions, respectively corresponding to said color filters;  
a plurality of vertical read-out units  
provided for every plurality of pixels in the vertical  
direction, for reading out signals from said pixels in the  
vertical direction;  
a horizontal read-out unit for reading out  
sequentially the signals from said plurality of vertical  
read-out units in the horizontal direction;  
an output unit for outputting sequentially the  
signals from said horizontal read-out unit; and  
control means for dividing said plural pixels  
on the unit basis of predetermined number of lines which  
include a plurality of first lines and a plurality of second  
lines, and thinning out the signals of the pixels of said  
plurality of second lines or adding the signals of the pixels  
of said plurality of first lines and the signals of the  
pixels of said plurality of second lines, thereby controlling

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B1 the pixels of said predetermined number of lines so as to generate one kind of color difference signal.

4. (Amended) An image pickup device comprising an image pickup element for picking up an image of an object, said image pickup comprising:

a color filter array comprising the color filters arranged in the horizontal and vertical directions, through which the image of the object is picked up by said image pickup element;

al cont: plural pixels constituting photoelectric converting elements arranged in the horizontal and vertical directions, respectively corresponding to said color filters;

a plurality of vertical charge transfer units provided respectively corresponding to the columns of said pixels in the vertical direction, for transferring electric charges from said pixels in the vertical direction;

a horizontal charge transfer unit connected to the ends of said vertical charge transfer units, for transferring the electric charges, transferred from said vertical charge transfer units, in the horizontal direction;

an output unit for converting the signal charges transferred from said horizontal charge transfer unit into an image signal and outputting said image signal

wherein said color filter array comprises an array, in the vertical direction, of a plural units of color filter groups wherein each unit comprises 8 rows in which an odd-numbered row is composed of an alternate array of a first color filter and a second color filter in a predetermined order while an even-numbered row is composed of an alternate array of a third color filter and a fourth color filter in a predetermined order; and

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the image signal corresponding to one row, within the image signal obtained from said image pickup element in a single image pickup operation, is outputted as a line-sequential color difference signal of said pixels of 4 rows in the vertical direction,

wherein said color filter at a  $(4n+1)$ th row and an odd-numbered column is same as the color filter at a  $(4n+3)$ th row and an even-numbered column;

said color filter at a  $(4n+2)$ th row and an odd-numbered column is same as the color filter at a  $(4n+4)$ th row and an even-numbered column;

said color filter at a  $(4n+1)$ th row and an even-numbered column is same as the color filter at a  $(4n+3)$ th row and an odd-numbered column;

*as anal.*  
said color filter at a  $(4n+2)$ th row and an even-numbered column is same as the color filter at a  $(4n+4)$ th row and an odd-numbered column; and

n being an integer equal to or larger than 0.

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5. An image pickup device according to claim 3, wherein the signal charges of two predetermined pixels which are mutually adjacent in the vertical direction, among the pixels arranged respectively corresponding to said color filter, are added and an image signal corresponding to said added signal charges is outputted from said output unit.

6. An image pickup device according to claim 4, wherein the signal charges of two predetermined pixels which are mutually adjacent in the vertical direction, among the pixels arranged respectively corresponding to said color filter, are added and an image signal corresponding to said added signal charges is outputted from said output unit.

7. An image pickup device according to claim 5, wherein said added signal charges of the two pixels are further added with the signal charges of two predetermined pixels which are present in the diagonal direction to the first-mentioned two pixels in a column adjacent to that of the first-mentioned two pixels, and an image signal corresponding to the added signal charges of four pixels is outputted from said output unit.

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8. An image pickup device according to claim 6, wherein said added signal charges of the two pixels are further added with the signal charges of two predetermined pixels which are present in the diagonal direction to the first-mentioned two pixels in a column adjacent to that of the first-mentioned two pixels, and an image signal corresponding to the added signal charges of four pixels is outputted from said output unit.

9. An image pickup device according to claim 7, wherein an image signal corresponding to signal charges is outputted from said output unit by combining a method of adding the signal charges in said vertical direction and in said diagonal direction and a method of further adding, to

the signal charges added in said vertical direction, signal charges in said vertical direction.

10. An image pickup device according to claim 8, wherein an image signal corresponding to said signal charges is outputted from said output unit by combining a method of adding the signal charges in said vertical direction and in said diagonal direction and a method of further adding, to the signal charges added in said vertical direction, signal charges in said vertical direction.

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11. An image pickup device according to claim 3, wherein said color filters corresponding to said predetermined two pixels are a combination of cyan and green and a combination of yellow and magenta, or a combination of yellow and green and a combination of cyan and magenta.

12. An image pickup device according to claim 4, wherein said color filters corresponding to said predetermined two pixels are a combination of cyan and green and a combination of yellow and magenta, or a combination of yellow and green and a combination of cyan and magenta.

13. An image pickup device according to claim 5,  
wherein said color filters corresponding to said  
predetermined two pixels are a combination of cyan and green  
and a combination of yellow and magenta, or a combination of  
yellow and green and a combination of cyan and magenta.

14. An image pickup device according to claim 6,  
wherein said color filters corresponding to said  
predetermined two pixels are a combination of cyan and green  
and a combination of yellow and magenta, or a combination of  
yellow and green and a combination of cyan and magenta.

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15. An image pickup device according to claim 7,  
wherein said color filters corresponding to said  
predetermined two pixels are a combination of cyan and green  
and a combination of yellow and magenta, or a combination of  
yellow and green and a combination of cyan and magenta.

16. An image pickup device according to claim 8,  
wherein said color filters corresponding to said  
predetermined two pixels are a combination of cyan and green  
and a combination of yellow and magenta, or a combination of  
yellow and green and a combination of cyan and magenta.



17. An image pickup device according to claim 9, wherein said color filters corresponding to said predetermined two pixels are a combination of cyan and green and a combination of yellow and magenta, or a combination of yellow and green and a combination of cyan and magenta.

18. An image pickup device according to claim 10, wherein said color filters corresponding to said predetermined two pixels are a combination of cyan and green and a combination of yellow and magenta, or a combination of yellow and green and a combination of cyan and magenta.

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19. An image pickup device according to claim 3, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

20. An image pickup device according to claim 4, wherein said image pickup element further comprises

electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

21. An image pickup device according to claim 5, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

22. An image pickup device according to claim 6, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control

the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

23. An image pickup device according to claim 7, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

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24. An image pickup device according to claim 8, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

25. An image pickup device according to claim 9, wherein said image pickup element further comprises

electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

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26. An image pickup device according to claim 10, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

27. An image pickup device according to claim 11, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control

the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

28. An image pickup device according to claim 12, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

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29. An image pickup device according to claim 13, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

30. An image pickup device according to claim 14, wherein said image pickup element further comprises

electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

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31. An image pickup device according to claim 15, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

32. An image pickup device according to claim 16, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control

the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

33. An image pickup device according to claim 17, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

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34. An image pickup device according to claim 18, wherein said image pickup element further comprises electrodes each of which is connected commonly to every fourth pixel in the vertical direction, and which are adapted to control the read-out of the signal charges from said pixels to said vertical charge transfer units and to control the transfer of the signal charges from said vertical charge transfer units to said horizontal charge transfer unit.

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35. An image pickup device according to Claim 3, wherein said control means effects the control of the pixels

so as to generate alternately different kinds of color difference signals on the predetermined number of lines basis.

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36. An image pickup device according to Claim 3, further comprising a signal processing circuit which subjects the signals output from said output unit, to an image processing, and an image display unit which display image information from said signal processing circuit.

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#### REMARKS

Claims 1-36 are now presented for examination. Claims 1, 3 and 4 are independent. New Claims 35 and 36 have been added. Claim 3 has been amended to further define Applicants' invention.

In the Office Action, Claims 1 and 2 were indicated as allowable.

Claims 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 and 34 were objected to as being dependent on a rejected base claim, but were indicated as being allowable if rewritten in independent form. Claim 4 has been rewritten in independent form and Applicants submit that Claims 6, 8, 10,